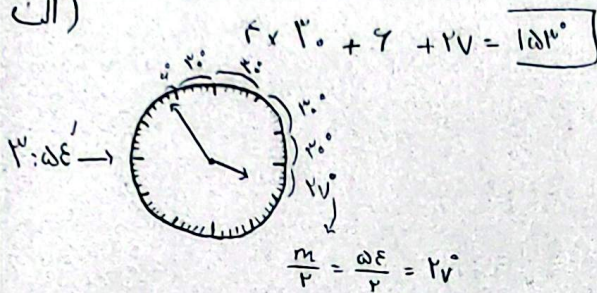


الف)



ب) $\theta = |5.5m - 30h|$

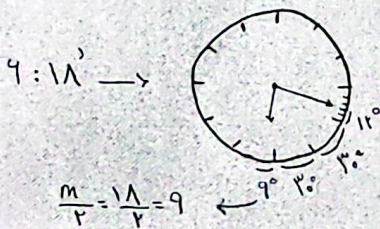
$\rightarrow |5.5 \times 54 - 30 \times 3|$

$= |297 - 90| = 207$

$340 - 207 = 133^\circ$

الف)

$2 \times 30 + 12 + 9 = 111^\circ$



ب) $\theta = |5.5m - 30h|$

$\rightarrow |5.5 \times 18 - 30 \times 4|$

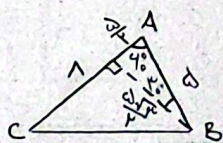
$= |99 - 120| = 21^\circ$

$S_{\text{قطاع}} = \frac{\alpha}{r} R^2 = \frac{\pi}{r} \times 9 = \frac{\pi}{4} \times 9 = \frac{9\pi}{4}$

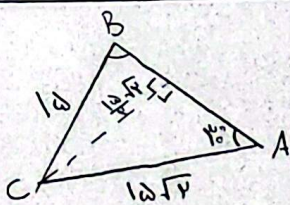
$\text{محیط قطاع} = \alpha R = \frac{\pi}{4} \times 4 = \pi$

$S_{ABC} = \frac{1}{2} AB \times AC \times \sin 40^\circ = \frac{1}{2} \times 5 \times 4 \times \frac{\sqrt{3}}{2} = 5\sqrt{3}$

$\text{محیط } ABC = AB + AC + BC = 5 + 4 + 7 = 16$



$BC = \sqrt{\frac{141}{4} + \frac{16}{4}} = \sqrt{\frac{157}{4}} = \frac{\sqrt{157}}{2} = 7$



$\sin \hat{B} = \frac{4}{5} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2} \Rightarrow \hat{B} = 60^\circ$

$\hat{C} = 180^\circ - 40^\circ - 60^\circ = 80^\circ$

$\hat{B} = \frac{4}{5} = \frac{x}{\pi} \rightarrow x = \frac{4\pi}{5} = \frac{4\pi}{5}$

$\hat{C} = \frac{10}{180} = \frac{x}{\pi} \rightarrow x = \frac{10\pi}{18} = \frac{5\pi}{9}$

$$\frac{\tan(\pi - \alpha) + r \tan(\pi + \alpha)}{\tan(r\pi - \alpha) - \tan(r\pi + \alpha)} = \frac{-\tan \alpha + r \tan \alpha}{-\tan \alpha - \tan \alpha} = \frac{r \tan \alpha}{-2 \tan \alpha} = -1$$

$$\tan \frac{\pi}{4} = a \rightarrow \tan 15^\circ = a, \cot 15^\circ = \frac{1}{a}$$

$$A = \frac{r \tan 15^\circ + \tan 15^\circ}{r \tan 15^\circ - \tan 15^\circ} = \frac{r \cot 15^\circ + \tan(\frac{\pi}{4} + 15^\circ)}{-r \tan 15^\circ - \tan(\frac{\pi}{4} - 15^\circ)} = \frac{r \cot 15^\circ - \cot 15^\circ}{-r \tan 15^\circ - \cot 15^\circ}$$

$$\Rightarrow \frac{\frac{r}{a} - \frac{1}{a}}{-ra - \frac{1}{a}} = \frac{\frac{1}{a}}{\frac{-ra^2 - 1}{a}} = \frac{1}{-ra^2 - 1}$$

$$\frac{\sin x + \cos x}{\sin x - \cos x} + \frac{\sin x - \cos x}{\sin x + \cos x} = r \rightarrow \frac{1 + r \sin \cos + 1 - r \sin \cos}{\sin^2 - \cos^2} = r$$

$$\rightarrow r = r \sin^2 - r \cos^2 \rightarrow r = r \sin^2 - r(1 - \sin^2) \Rightarrow r = r \sin^2 - r + r \sin^2$$

$$\rightarrow \sin^2 = \frac{\omega}{r}, \cos^2 = 1 - \frac{\omega}{r} = \frac{1}{r}, \tan^2 = \frac{\sin^2}{\cos^2} = \frac{\frac{\omega}{r}}{\frac{1}{r}} = \omega$$

$$\frac{\sin^2 x - r \cos^2 x + 1}{\sin^2 x + r \cos^2 x - 1} = r \rightarrow \frac{\sin^2 x - r + r \sin^2 x + 1}{1 - \sin^2 x} = r \rightarrow r \sin^2 x - 1 = r - r \sin^2 x$$

$$\rightarrow r \sin^2 x = \omega \rightarrow \sin^2 x = \frac{\omega}{r}, \cos^2 x = 1 - \frac{\omega}{r} = \frac{1}{r}, \tan^2 x = \frac{\frac{\omega}{r}}{\frac{1}{r}} = \frac{\omega}{1}$$

$$ا) \cos(45^\circ) = \cos(2 \times 22.5^\circ)$$

$$\cos(2\alpha) = \cos^2 \alpha - \sin^2 \alpha \rightarrow \cos 45^\circ = \cos^2 22.5^\circ - \sin^2 22.5^\circ \Rightarrow \frac{\sqrt{2}}{2} = \cos^2 22.5^\circ - 1 + \cos^2 22.5^\circ$$

$$\rightarrow \frac{1 + \sqrt{2}}{2} = \cos^2 22.5^\circ \rightarrow \cos(22.5^\circ) = \frac{\sqrt{1 + \sqrt{2}}}{2}$$

$$ب) \sin(45^\circ) = \sin(2 \times 22.5^\circ)$$

باز به این روش 22.5° و 45° را به دست می آوریم پس $\sin 45^\circ = \cos 22.5^\circ$

$$\rightarrow \sin 45^\circ = \frac{\sqrt{1 + \sqrt{2}}}{2}$$